PONY

Maths

For The Primary Stage



5th.

Primary Lessons

First Term 2018

Unit 1

Fractions

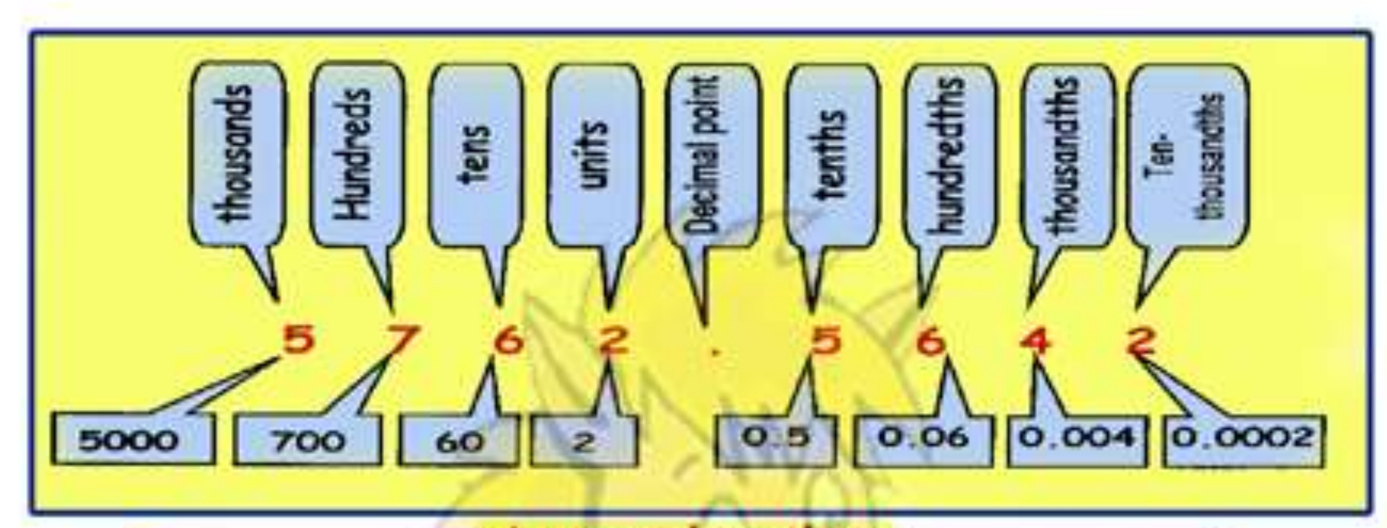
Lesson 1

Approximating to the nearest Hundredth and Thousands

The Approximation (Rounding) means to replace the number by another number very near to it

the symbol (≃) is read as approximately equal

2 3 5 4 6 (+1, 6 > 5) → ≃ 2 3 5 5 0 To the nearest 10	2 3 5 4 6 (+0, 4 < 5) → ≃ 2 3 5 0 0 To the nearest 100
2 3 5 4 6 (+1, 5 = 5) → ≃ 2 4 0 0 0 To the nearest 1000	2 3 5 4 6 (+0, 3 < 5) → ≃ 2 0 0 0 0 To the nearest 10 000
2 3 . 4 (+0, 4 < 5) → ≃ 2 3 To the nearest unit	2 3 . 5 4 (+1, 5 = 5) → ≃ 2 4 To the nearest unit
2 3 5.4 6 (+1, 6 > 5) → ≃ 2 3 5.5 To the nearest 0.1	2 3.5 4 6 (+0, 4 < 5) → ≃ 2 3.5 To the nearest tenth

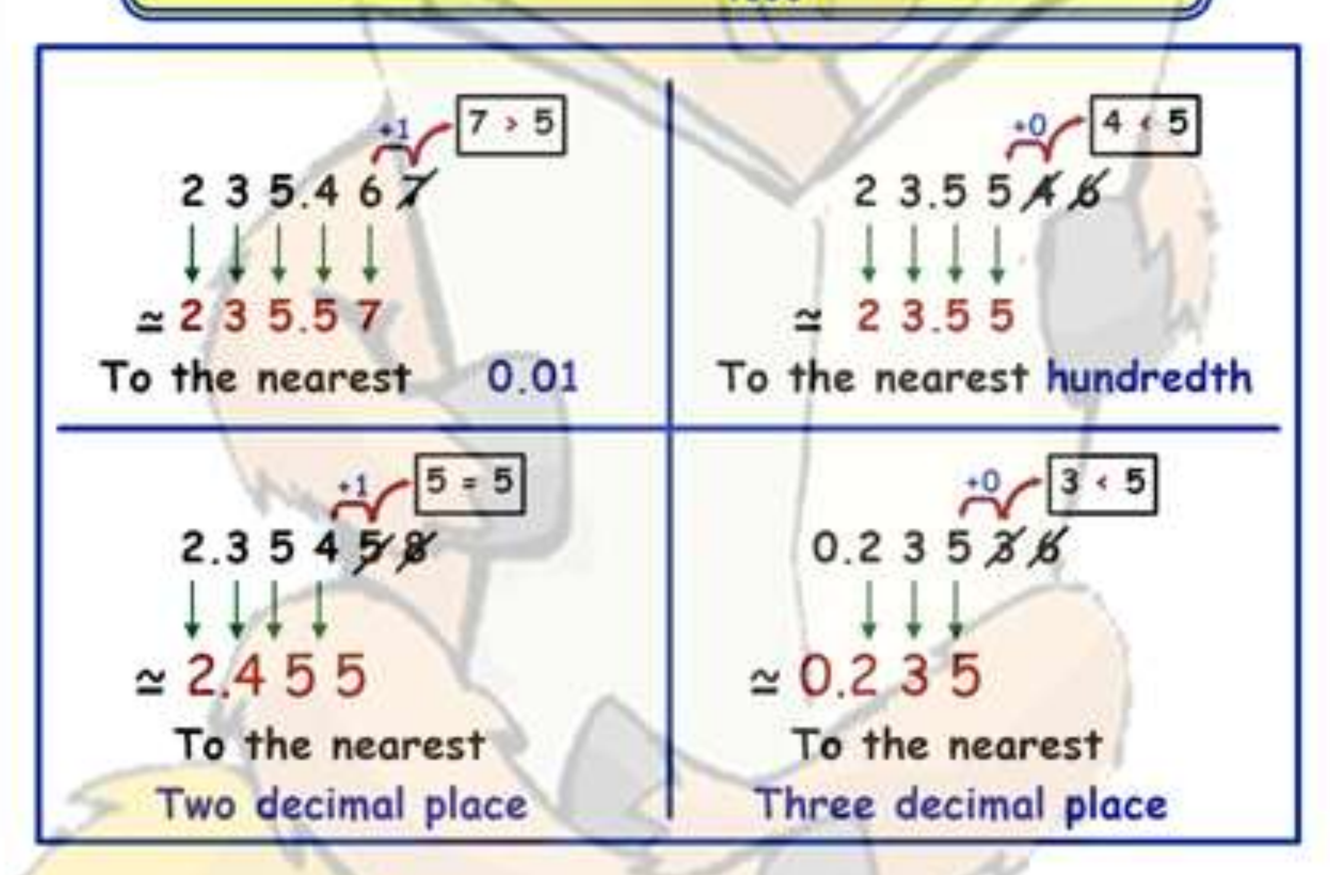


Approximation

To the nearest

hundredth , 0.01 , $\frac{1}{100}$, two decimal places

thousands , 0.001 , $\frac{1}{1000}$, three decimal places



Approximate 4.574 to the nearest hundredth :



4.574 ≃ 4.57 to the nearest 0.01

Approximate each of the following to the nearest hundredth.

(a) 4.908 ≃ ....

(b) 147.041 ≃ ....

(c) $39\frac{3}{1000}$ = ... ≃ ....

(d) $31\frac{9}{250}$ = ... ≃ ....

Approximate each of the following numbers to the nearest thousandth.

(a) 19.9996 ≃ ....

(b) 0.0673 ≃ ....

(c) $17\frac{23}{10000}$ = ... ≃ ....

(d) $8\frac{9}{5000}$ = ... ≃ ....

Find The result of each of the following then approximate it to the nearest thousandth.

(a) 35.241 + 6.0344 = ... ≃ ....

(b) 42.5667 − 25.36 = ... ≃ ....

Complete:

(a) The number 83.7695 ≃ 83.7700 to the nearest ....

(b) The number 1.2939 ≃ 1.294 to the nearest ....

(c) The number 521.291 ≃ 521.3 to the nearest ....

(d) The number 152.23 ≃ 150 to the nearest ....

Approximating to the nearest UNIT

Ex. (a) 5.68 cm ≃ .... (to the nearest cm)

(b) 3568 cm ≃ .... (to the nearest m)

The same

(a) 5.68 cm ≃ ....6.......cm (to the nearest ~~cm~~ unit)

different

(b) 3568 cm = 35.68 m ≃ .....36... m (to the nearest ~~m~~ unit)

Complete:

Ⓐ 39 days = ... = ... weeks.

≃ .... weeks.

Ⓑ 255 hours = ... = ... days.

≃ .... days.

Ⓒ 12.4658 kilometers ≃ .... kilometers.

Ⓓ 67 months = ... = ... years.

≃ .... years.

Write down the smallest decimal fraction that includes the digits (2, 5, 7, 8), then approximate that number to the nearest hundredth and nearest thousandth.

....

....

A road extends for 74389 meters. Find its length in kilometers approximating the result to the nearest hundredth.

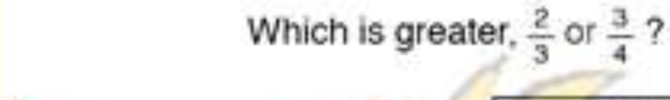
....

....

Given that: X = 13.452 , Y = 7.273

Find X + Y approximating the sum to the nearest hundredth.

X + Y = ... + ... = ... ≃ ....



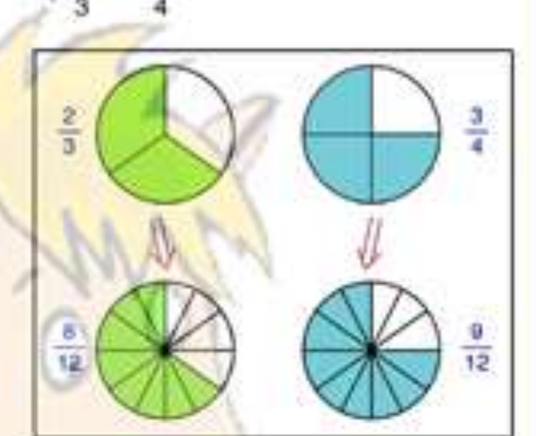
Lesson 2

Comparing and Ordering Fractions

Which is greater, $\frac{2}{3}$ or $\frac{3}{4}$?

8 $\frac{2}{3}$ ☐ $\frac{3}{4}$ 9

$\frac{2}{3} < \frac{3}{4}$



To compare $3\frac{1}{2}$, 3.2

$3\frac{1}{2} = 3.5$

$3.5 > 3.2 \rightarrow 3\frac{1}{2} > 3.2$

Put the suitable sign (< , = , >) for each ☐

(a) $\frac{4}{5}$ ☐ $\frac{3}{4}$

(e) $2\frac{1}{4}$ ☐ $2\frac{1}{3}$

(b) 4376 ☐ 0.407

(f) $\frac{7}{8}$ ☐ 0.775

(c) $\frac{5}{6}$ ☐ $\frac{7}{8}$

(g) $4\frac{7}{12}$ ☐ $4\frac{2}{3}$

(d) $2\frac{7}{9}$ ☐ 2.7

(h) 7 ☐ $6\frac{6}{9}$

Ex. Arrange the following in an ascending order : $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$, $\frac{1}{4}$

$\frac{1}{2} = \frac{6}{12}$ (2) $\frac{2}{3} = \frac{8}{12}$ (3) $\frac{5}{6} = \frac{10}{12}$ (4) $\frac{1}{4} = \frac{3}{12}$ (1)

The order : $\frac{1}{4}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$

Arrange each of the following in a descending and an ascending order :

(a) $\frac{2}{13}$, $\frac{5}{13}$, $\frac{3}{13}$, $\frac{4}{13}$

ascending ……… , ……… , ……… , ………

descending ……… , ……… , ……… , ………

(b) $\frac{7}{9}$, $\frac{7}{15}$, $\frac{7}{8}$, $\frac{7}{10}$

ascending ……… , ……… , ……… , ………

descending ……… , ……… , ……… , ………

(c) $3\frac{1}{5}$, $6\frac{3}{4}$, $8\frac{5}{8}$, $3\frac{1}{2}$

ascending ……… , ……… , ……… , ………

descending ……… , ……… , ……… , ………

(d) $\frac{3}{4}$, $\frac{1}{5}$, $\frac{1}{2}$, $\frac{7}{10}$

ascending ……… , ……… , ……… , ………

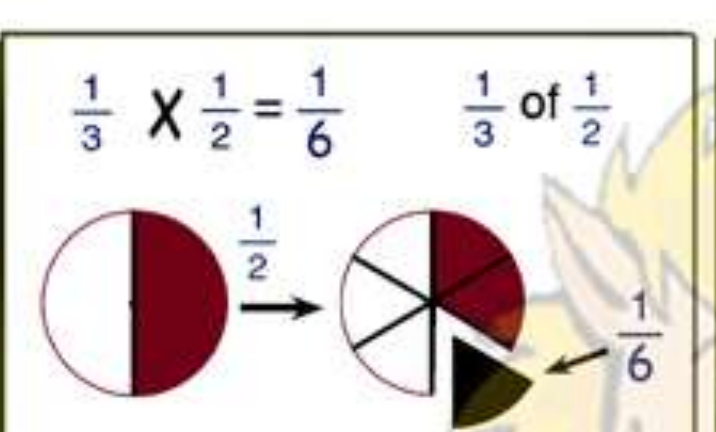
descending ……… , ……… , ……… , ………

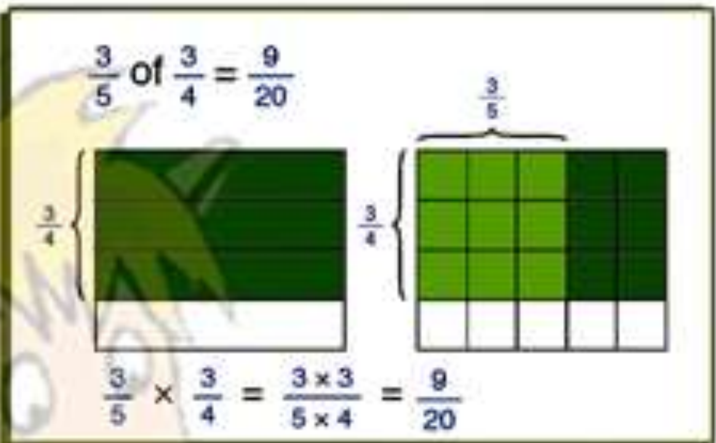
Find the values of a, b, and c If:

(a) $\frac{2}{5} = \frac{a}{15}$ (b) $\frac{b}{8} = \frac{15}{24}$ (c) $\frac{2}{3} = \frac{16}{c}$

a = ……… b = ……… c = ………

Multiplying Common Fractions





$$\frac{5}{6} \times 7\frac{1}{2} = \frac{5}{6} \times \frac{15}{2} = \frac{75}{12} = 6\frac{1}{4}$$

Multiply . Write the answers in the simplest form.

(a) $\frac{2}{5} \times \frac{1}{2} =$ .... (b) $\frac{2}{5} \times \frac{5}{6} =$ ....

(c) $\frac{7}{8} \times 1\frac{1}{7} =$ .... $\times$ .... $=$ ....

(d) $5\frac{1}{3} \times 3\frac{3}{4} =$ .... $\times$ .... $=$ ....

(e) $\frac{2}{5} \times \frac{3}{4} \times \frac{5}{9} =$ ....

(f) $5 \times \frac{1}{8} \times 3\frac{1}{5} =$ .... $\times$ .... $\times$ .... $=$ ....

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Find

a $\frac{3}{5}$ of an hour = ... = ... minutes

b $\frac{5}{8}$ of a day = ... = ... hours.

c $\frac{1}{2}$ of L.E. 30 = ... = ... L.E.

d $\frac{1}{5}$ of 8 m. = ... = ... cm.

Find the missing numbers :

(a) $\frac{3}{\cdots} \times \frac{4}{5} = \frac{12}{35}$

(b) $3\frac{1}{2} \times$ .... $= 7$

(c) $\frac{4}{5} \times$ .... $= 1$

(d) $1\frac{1}{4} \times$ .... $= 5$

(e) $\frac{\cdots}{4} \times \frac{3}{5} = \frac{15}{\cdots}$

(f) $3\frac{1}{3} \times$ .... $= 10$

(g) $3\frac{1}{5} \times$ .... $= 1$

(h) $10\frac{1}{4} \times$ .... $= 41$

Peter practices decorating cakes for $\frac{3}{4}$ of an hour each day. How many hours does he practice in 7 days?

....

....

$\frac{5}{8}$ Of 40 students in a cooking class, are preparing to be chefs. How many students is this?

....

....

Dividing Fractions

$3 \div \frac{1}{4} = \quad 3 \times \frac{4}{1} = 12$ ◀ there are 12 quarters in 3

($\frac{1}{4}$ and $\frac{4}{1}$: reciprocals)

$2\frac{1}{2} \div 2 = \frac{5}{2} \times \frac{1}{2} = \frac{5}{4} = 1\frac{1}{4}$

(2 and $\frac{1}{2}$: reciprocals)

Divide. write the answers in lowest terms.

(a) $\frac{2}{3} \div \frac{1}{6} =$ ....

(b) $\frac{1}{8} \div \frac{3}{4} =$ ....

(c) $\frac{7}{12} \div \frac{1}{6} =$ ....

(d) $4\frac{1}{2} \div \frac{1}{2} =$ ....

(e) $\frac{1}{9} \div 1\frac{1}{3} =$ ....

(f) $2\frac{4}{5} \div 1\frac{3}{4} =$ ....

(g) $3\frac{4}{7} \div 5\frac{5}{4} =$ ....

Lesson 5

Multiplying Decimals by 10 , 100 ,1000 , ...

To multiply by { 10 / 100 / 1000 } move the decimal point { 1 / 2 / 3 } Place to the right

0.45 X 10 = 4.5

2.788 X 10 = 27.88

0.4 X 100 = 40

2.8 X 100 = 280

0.4 5 8 5 X 1000 = 4 5 8.5

2.4 5 X 1000 = 2 4 5 0

Multiply.

(a) 3.54 × 10 = ...

(b) 10 × 0.8 = ...

(c) 2.74 × 100 = ...

(d) 54.8 × 100 = ...

(e) 4.376 × 1000 = ...

(f) 0.762 × 1000 = ...

(g) 1000 × 0.81 = ...

(h) 1000 × 6.7 = ...

Complete:

0.8 X .... = 80

0.98 X .... = 9.8

3.89 X .... = 389

0.758 X .... = 75.8

0.9 X .... = 900

0.38 X .... = 38

.... X 10 = 5

.... X 10 = 0.5

.... X 100 = 987

.... X 100 = 6.58

.... X 1000 = 3200

.... X 1000 = 35.6

Remember

Units of lengths
1 km = 1000 m   1 m = 100 cm   1 m = 10 dm   1 dm= 10 cm

Units of Money   L.E. 1 = P.T. 100

Units of Weights   1 kg = 1000 gm   1 tone = 1000 kg

Complete :

5.8 kg = ... X .... = ... gm

3.88 ton = ... X .... = ... kg

5.877 km = ... X .... = ... m

65.124 m = ... X .... = ... cm

56.47 dm = ... X .... = ... cm

6.354 m = ... X .... = ... dm

5.78 LE = ... X .... = ... PT

Choose the correct answer from the parentheses:

Ⓐ 98.7 × 100 = ... (987 - 9870 - 0.987 - 0.0987)

Ⓑ 0.067 × 1000 = ... (6.7 - 67 - 0.067 - 670)

Ⓒ 21.3 × 10 = ... (2130 - 2.13 - 213 - 0.0213)

Put (< , > or =) in the empty spaces:

Ⓐ 4.72 × 10 ☐ 0.472 × 100

Ⓑ 3.251 × 100 ☐ 325.1 × 100

Ⓒ 72.15 × 10 ☐ 0.07215 × 1000

Lesson 6

Dividing Decimals by 10 , 100 ,1000 , ...

To divide by		move the decimal point	
	10		1 Place to the left
	100		2 Place to the left
	1000		3 Place to the left

24.5 ÷ 10 = 2.45

278.8 ÷ 10 = 27.88

0.4 ÷ 100 = 0.004

2.8 ÷ 100 = 280

4 5 8 5 ÷ 1000 = 4.5 8 5

2.4 5 ÷ 1000 = 0. 0 0 2 4 5

Divide.

(a) 27.54 ÷ 10 = ……

(b) 0.7 ÷ 10 = ……

(c) 8.7 ÷ 100 = ……

(d) 536.5 ÷ 100 = ……

(e) 496.4 ÷ 1000 = ……

(f) 86.3 ÷ 1000 = ……

Complete :

5.8 gm = …… ÷ …… = …… kg

3.88 dm = …… ÷ …… = …… m

3.8 ÷ …… = 0.38

3.25 ÷ …… = 0.0325

56PT = …… ÷ …… = …… LE

587.7 cm = …… ÷ …… = …… m

…… ÷ 10 = 0.45

…… ÷ 100 = 1.258

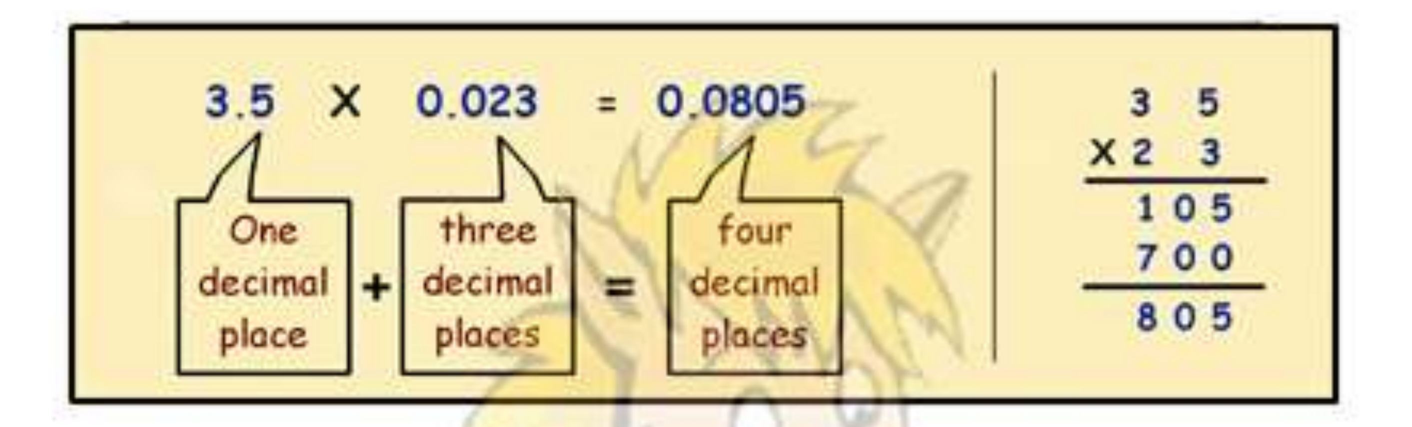
378.45 ÷ 10 = …… ≈ …… To the nearest unit

99999 ÷ 10 = …… ≈ …… To the nearest 1000

A car consumes one liter of gasoline to travel 10 Kilometers. How many liters of gasoline does it need to travel a distance of 534.8 Kilometers?

……………………………………………………………

Lesson 7 Multiplying Decimals



If: **326 × 7 = 2282 , 37 × 52 = 1924,**

then complete the following without multiplying:

Ⓐ 3.26 × 7 = ... Ⓑ 0.326 × 0.07 = ...

Ⓒ 32.6 × 7 = ... Ⓓ 3.7 × 5.2 = ...

Ⓔ 0.37 × 52 = ... Ⓕ 0.326 × 0.7 = ...

Ⓖ 0.0037 × 52 = ... Ⓗ 0.37 × 5.2 = ...

Ⓘ 3.26 × 17 = 3.26 × (7 + ...)

= (3.26 × 7) + (.......... × ....)

= .... + ... = ...

Find the result of each of the following:

Ⓐ 2.37 × 5.2 = ... Ⓑ 0.251 × 9 = ...

Ⓒ 2.15 × 7 + 2.15 × 3 = ... × (......... + ...)

= .... × .... = ...

Compare the products of the following by putting < or > or =:

Ⓐ 12.35 × 2.5 ☐ 12.35 × 0.25

Ⓑ 48.2 × 3.7 ☐ 4.82 × 37

Ⓒ 4.2 × 1.53 ☐ 4.2 × 15.3

Ⓓ 0.206 × 1.5 ☐ 2.06 × 0.3 × 0.5

The price of a bar of chocolate is LE 2.75,
what is the cost of 15 bars of the same kind?

....

....

Ahmed bought 12 cans of juice. The price of each can was LE 1.75.
What is the total cost of the juice?
How much would the seller pay back to Ahmed if he paid him LE 30?

....

....

A car covers equal distances in equal times. How many kilometers does it cover in 2 hours and 15 minutes if its speed is 73.25 Kilometers per hour?

....

....

Dividing by 3-digit number

Divide : 246 - 82 = 3

```
       0 0 3
 8 2 | 2 4 6
      -2 4 6
      ------
       0 0 0
```

2628 - 652 = 4

```
            0 0 0 4
 6 5 2 | 2 6 2 8
        -2 6 0 8
        --------
Remainder → 0 0 2 0
```

Divide :

208 ÷ 52	405 ÷ 45	308 ÷ 38
2269 ÷ 574	8058 ÷ 843	3258 ÷ 543
5320 ÷ 665	3168 ÷ 792	6952 ÷ 869
1256 ÷ 157	4212 ÷ 468	721 ÷ 103

Divide :

1968 - 82 = 24

```
     0 0 2 4
82 | 1 9 6 8
    -1 6 4
     0 3 2 8
   -   3 2 8
       0 0 0
```

22820- 652 = 35

```
      0 0 0 3 5
652 | 2 2 8 2 0
     -1 9 5 6
        3 2 6 0
       -3 2 6 0
        0 0 0 0
```

52 ⟌ 2496

48 ⟌ 4176

524 ⟌ 24104

528 ⟌ 228096

692 ⟌ 333544

275 ⟌ 57200

The result of multiplying 2 numbers is 9088. If one of them is 284, find the other number.

....

An owner of packing food factories wanted to pack 5904 kilograms of suger equally in 492 packs. What is the weight of each pack?

....

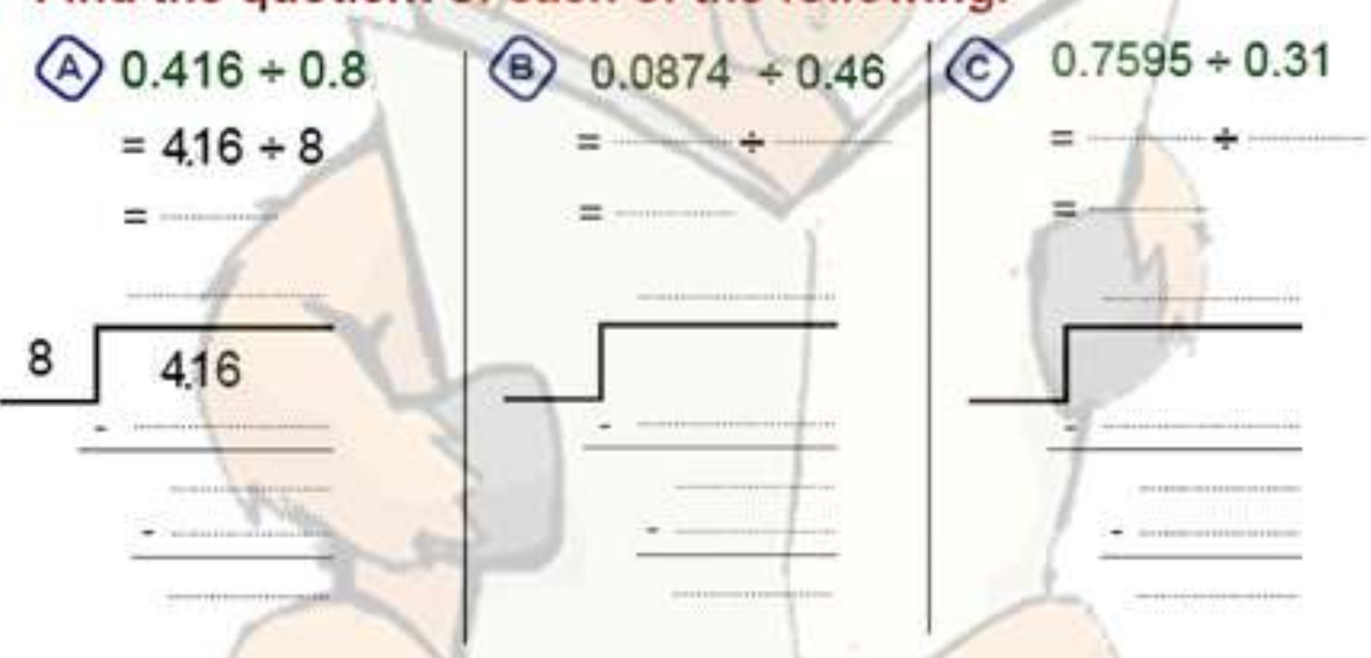
Dividing by Decimals

Divide: $5.6 \div 0.7 = 56 \div 7 = 8$

$3.175 \div 0.25 = 317.5 \div 25 = 12.7$

$76.5 \div 7.65 = 7650 \div 765 = 10$

Find the quotient of each of the following.



Ⓐ $0.416 \div 0.8$
$= 416 \div 8$
= ....

8 ⟌ 416

Ⓑ $0.0874 \div 0.46$
= .... ÷ ....
= ....

Ⓒ $0.7595 \div 0.31$
= .... ÷ ....
= ....

Find a number when multiplied by 0.64, then the result is 075.52

....

A bundle of paper has a height of 4.5 cm. If all its papers were of equal thickness where the thickness of each paper was 0.090 milimeters, find how many papers does the bundle include?

....

....

Convert the common fraction to the dicemal form

$\frac{3}{4} = 3 \div 4$

$= 3.00 \div 4$

$= 0.75$

$$\begin{array}{r} 0.75 \\ 4\overline{)3.0} \\ -2.8 \\ \hline 0.20 \\ -0.20 \\ \hline 0 \end{array}$$

Convert the following to the decimal forms.

Ⓐ $\frac{1}{4}$ = ... ÷ .... = ...

Ⓑ $\frac{1}{2}$ = ... ÷ .... = ...

Ⓒ $\frac{4}{25}$ = ... ÷ .... = ...





Find the quotient of each of the following:

Ⓐ 2.67 ÷ 1.2

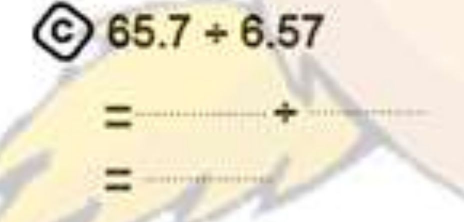
= .... ÷ ....

= ....

Ⓒ 65.7 ÷ 6.57

= .... ÷ ....

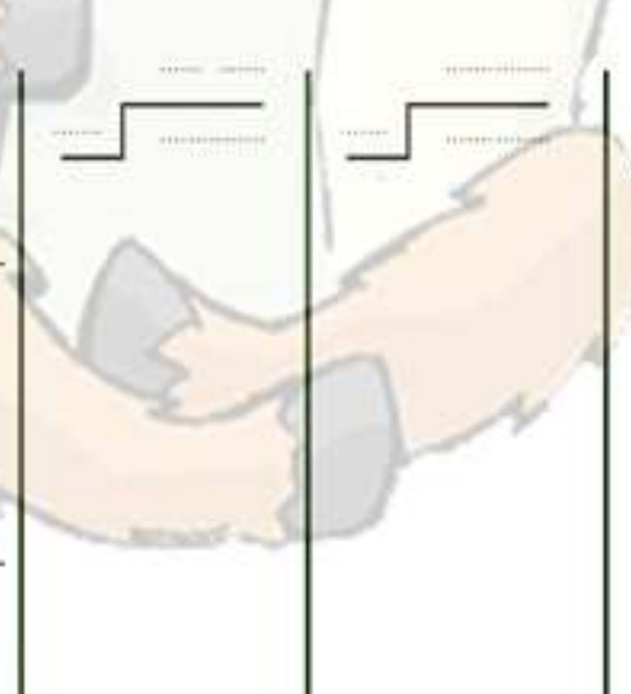
= ....



Ⓑ 0.171 ÷ 1.9

= .... ÷ ....

= ....



Lesson 10 Infinite Division

Divide

$3 \div 7$ to the nearest $\frac{1}{100}$

$3 \div 7 = 0.428 \simeq 0.43$

$$\begin{array}{r} 0.428 \\ 7 \overline{)3.0} \\ -\ 2.8 \\ \hline 0.20 \\ -\ 0.14 \\ \hline 0.060 \\ -\ 0.056 \\ \hline 0.004 \end{array}$$

Complete:

Ⓐ $\frac{7}{3}$ = ... ≃ ...... Ⓒ $\frac{3}{11}$ = ... ≃ ...... to the nearest $\frac{1}{10}$

Ⓑ $\frac{5}{9}$ = ... ≃ ...... Ⓓ $\frac{9}{7}$ = ... ≃ ...... to the nearest $\frac{1}{100}$

Find the quotient in each of the following:

Ⓐ $9.568 \div 9\frac{1}{5}$

= .... + ...

= .... + ...

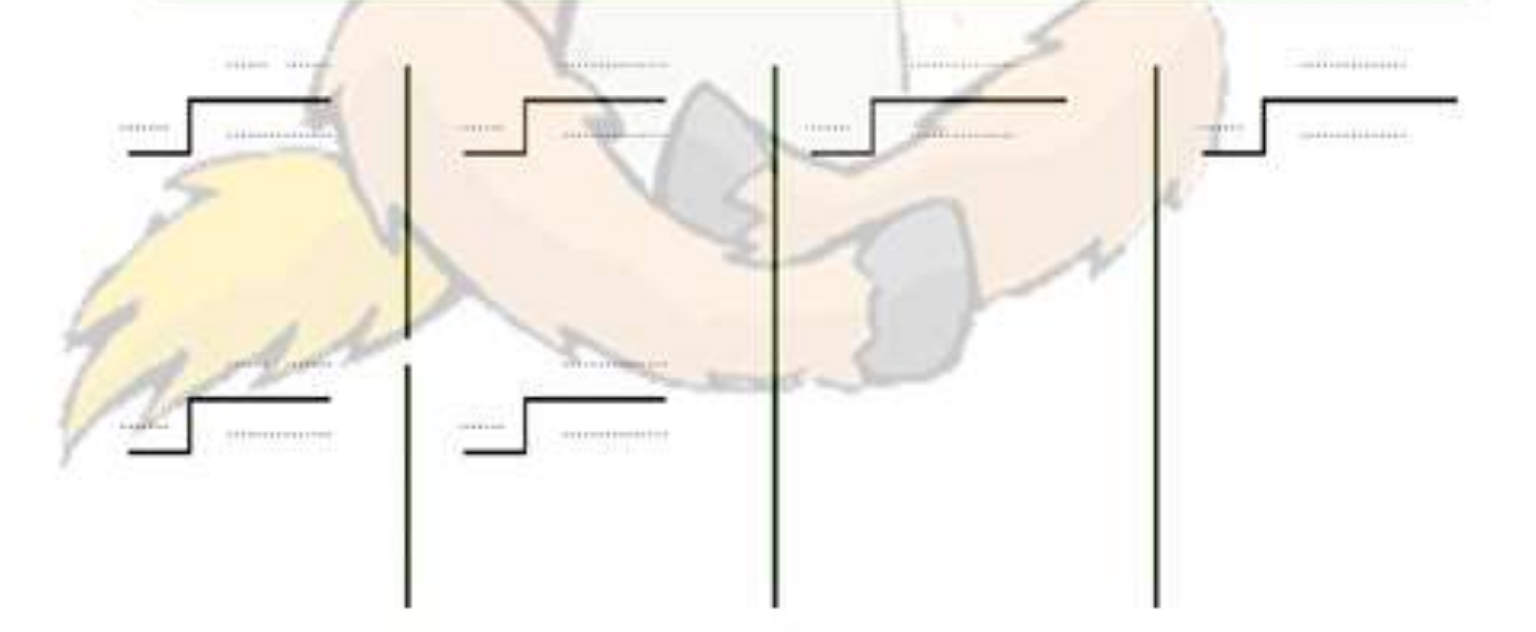
= ....

Ⓑ $2\frac{1}{8} \div 0.125$

= .... + ...

= .... + ...

= ....



Unit 2

SETS

Lesson 1 What is a set?

The set: it is a collection of known objects that are clearly defined, and they have a certain property in common.

Elements of a set

The objects which a set contains are called "the elements or the members of the set".

Example

The letters in the word "tomato" represents a set because it is defined well, its elements are t, o, m, a. (Note that t and o appear only once when listing the elements of a set, none of them are repeated).

1 Complete the following table

The expression	A set/not a set
The months of the Hegri year.	....
The tall students in your class.	....
The seasons of the year.	....
The letters of the word "Egypt"	....
The beautiful stories	....
The prime numbers between 5 and 25	....

2 write down all the elements in the following sets:

The set of the digits in the number 3072 ....

The set of the colors in Egypt's flag ....

The set of the days in the week

....

The set of the year's months that have less than 30 days.

....

The set of 2-digit numbers and each is like the other.

....

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Lesson 2 Mathematical Expression of a set

First: The listing method

- A pair of braces { } is used to designate a set with the elements listed or written inside the braces. The braces mean "the set of" or "the set whose elements are".

The expression {1, 3, 5, 7, 9} is read "The set whose elements are one, three, five, seven, nine" and may be described as the set of one - digit odd numbers or the set of odd digits.

- Capital letters are used to designate sets:

B = {1, 2, 3, 4, 5, 6, 7, 8, 9} reads "B is the set whose elements are one, two, three, four, five, six, seven, eight, nine".

- Small letters may name elements of sets such as:

R = {m , a , t , h}

- Sets which contain exactly the same elements are called equal sets.

{4, 2, 3} and {3, 4, 2} are equal sets. The elements may be listed or written in any order. It is not allowed to repeat an element when listing them.

- Sets which contain the same number of elements are called equivalent sets.

{1, 2, 3, 4} and {1, 3, 5, 7} are equivalent sets.

Second: The description method

In that method, we define the property which distinguishes and determines the elements of a set.

For example, The set: {c, a, r, e} can be expressed as follows: The set of the letters forming the word care. or the set of the letters forming the word (race), or the set of the letters forming the word (acre).

It can be written in the following form: {x : x is one of the letters forming the word care}, and it is read as the set of all x where x is one of the letters forming the word care.

Complete the table to express the following sets:

The listing Method	the description method
{c, a, r}	The set of the letters forming the word car
{east, west, north, south}	....
{................................}	The set of the colors forming Egypt's flag
{................................}	The set of the digits in the number 46421.
....	The set of the letters of the word (Series)
{2, 4, 6, 8, 10}	....
{1, 3, 5, 7, ...}	....
{0, 2, 4, 6, 8, ...}	....

Representing sets using Venn diagrams

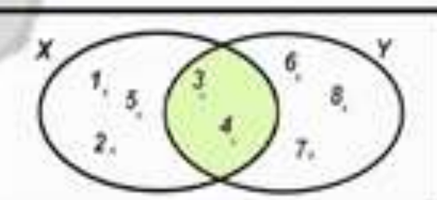
Scientist Jan Venn, could represent every element in a set by placing a point or an (*x*) mark in any closed geometric shape such as (a triangle, a circle, a rectangle, ... etc),

For example: The set X = {2, 3, 5, 9} can be represented by using a Venn diagram as follows:



X = { 1 , 2 , 3 , 4 , 5 } *Y = { 6 , 3 , 4 , 7 , 8 }*

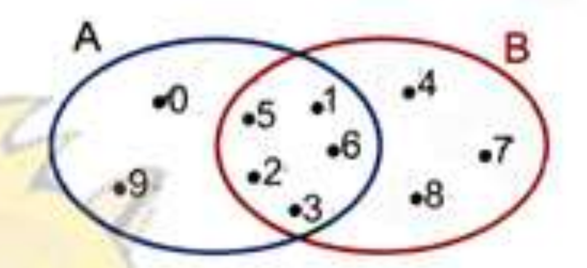
Represent in one diagram the two sets X and Y



List the elements of each of the sets A and B :

A = { .... }

B = { .... }



If X = {7, 9, 15, 3, 5} , Y = {3, 5, 11, 13, 19}

Then the following figure represents the two sets X and Y , complete the venn diagram.



A = { .... }

B = { .... }

C = { .... }

What number is in both A and B, but not in C?

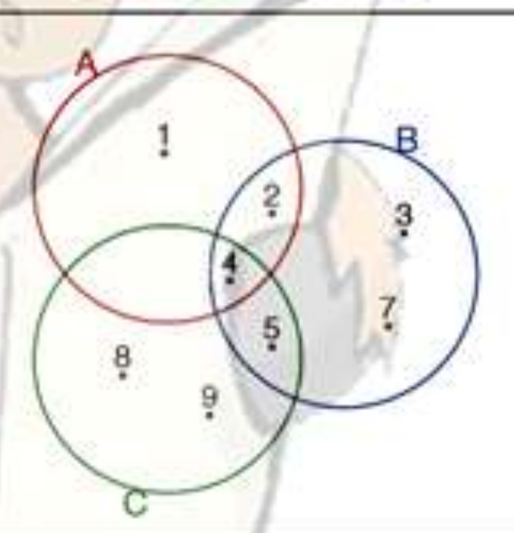
....

What numbers are in C but not in A or B?

....

What letter is not in B but is in A and C ?

....



Let A = {2 , 3 , 4 , 5} ,

B = {5 , 6 , 7 , 8}

and C = {4 , 5 , 9}

Draw a Venn diagram to represent these sets , then find :

a The common elements in A and C ....

b The common elements in B and C ....

c The common elements in A , B and C ....

Lesson 2 Belonging of an element to a set

- The symbol "∈" is used to denote that an object is an element of the set.

$5 \in B$ means "Five is an element of set B."

- The symbol "∉" indicates that an object is not an element of the set.

$12 \notin B$ means "Twelve is not an element of set B.

Example: If Y = {4, 5, 7, 9, 11}. Then $4 \in Y$, $5 \in Y$ and $11 \in Y$, while $8 \notin Y$ and $12 \notin Y$.

If X is a set where X = {2, 3, 5, 6}

Place the suitable symbol ∈ or ∉ in the blanks to make each sentence true:

A) 3 X
B) 5 ... X
C) 7 X
D) 6 ... X
E) 0 ... X
F) 2 .. X
G) 1 ... X
H) 32 ... X

Place the suitable symbol ∈ or ∉ in the blanks to make each sentence true:

A) 2 .... {3, 1, 7}
C) 3 .... The set of the odd numbers
B) Y .... the set of the letters forming the letters of the word Egypt.
D) 7 .... the set of the days of the week
F) 3 .... {13, 33, 330}
E) The month march .... the set of the seasons of the year.

Fill in using a suitable number:

A) If 4 ∈ { 2, x, 5 } Then x = ...
B) If 5 ∈ { 7, 9 , x } Then x = ...
C) If 5 ∈ { 3, 4 + x } Then x = ...
D) ...... ∈ {3, 5, 10} and belongs also to the set of the prime factors of the number 6.

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Types of sets

- Sets may contain one element, a definite number of elements, an unlimited number of elements or no elements.

The null (empty) set

A set containing no elements is called the null set or **empty** set and is denoted by the symbol "∅" or { }.

{Cats that can fly} = { } = ∅

$\varnothing \neq \{0\}$

where ∅ is a set containing no elements while $\{0\}$ contains one element which is zero.

The finite set

A set that contains a countable number of elements is called a **finite** set. we can easily count the number of its elements.

{Letters in the word "Good"} = {G, o, d}

The null set "∅" is a finite set for the number of its elements is zero.

The infinite set

A set that contains an uncountable number of elements is called an **infinite** set. we can not actually count its elements.

{ Whole numbers } = {1, 2, 3, ...}

Note: a row of dots... is used to show that more numbers follow, but they have not all been listed.

Which of these sets is a finite set and which of them is an infinite set. Write the elemetns of every finite set:

The set	finite	Number of elements	Infinite
The set of the days in a week	✓	7	✗
The set of the months in a gregorian year			
The set of the odd numbers			
The set of the prime numbers less than 20.			
The set of the letters forming the word (sondos).			
The set of the factors of the number 3.			
The set of the alphabets in the English language.			

Which of these sets is a null set and which of them is not a null set:

A The set of students in your class who made a trip to the moon.

(....................................)

B The set of the Egyptian governorates in Asia.

(....................................)

C The set of those numbers divisible by 7 and are between 8, 15.

(....................................)

D The set of the factors of 15 which are divisible by 2.

(....................................)

E The set of those numbers divisible by 5 and are between 5, 10.

(....................................)

F The set of the governorates in upper Egypt that are located on the Mediterranean sea.

(....................................)

Lesson 4

Equal Sets
Inclusion and Subsets

The set X = The set Y
If the two sets have the same elements exactly

Put (✓) for the true sentence and (✗) for the false one:

- (A) {1, 2, 5} = {21, 5} ( )
- (B) {a, r, c} = the set of the letters forming the word (car) ( )
- (C) {1, 2, 3, 6 } = the factors of the number 6. ( )
- (D) {x, 2, 5} = {2, 5, 3} where x = 3. ( )

If X = the set of the letters forming the word (lab), Y = the set of the letters forming the word (ball), is X = Y? ....

If {x, 2, 7} = the set of the digits in the number 2257, find the value of x. ....

Match the equal sets in the following columns:

{6, 8, 9}	the set of the letters forming the word (ziwel)
{10, 12, 14, ..., 98}	the set of the digits of 9688
{3, d}	{Summer, winter, spring, autumn}
{z , l, e, w, L}	the set of the months in a year that have 35 days
the set of the seasons of the year.	{d, 3}
∅	the set of the even numbers that have 2 digits.

---

place (✓) for the true sentence and (✗) for the false sentence:

- (A) {0, 2, 4, 6}= the set of the even numbers less than 6. ( )
- (B) {77, 99} = the set of the digits of 9977. ( )
- (C) {3, 6, 9, ...}= the set of the counting numbers that are divisible by 3. ( )

Inclusion and subsets

- The symbol $\subset$ is used to denote that a set is a subset of the set.
- The symbol $\not\subset$ is used to denote that a set is not a subset of the set.

Since the empty set $\varnothing$ does not contain any element, then it is considered a subset of any set

i.e. $\varnothing \subset \{a, b, c\}, \varnothing \subset \{1, 2, 3, \cdots\}, \varnothing \subset \{0\}$

Any set is considered to be a subset of itself "$X \subset X$"

i.e. $\{1, 2\} \subset \{2, 1\}$

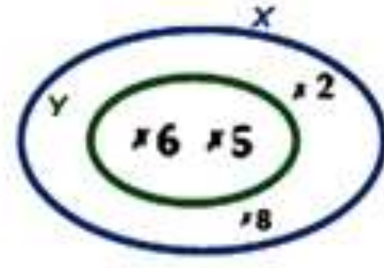
Complete the table:

Set X	Set Y	Use $\subset$ or $\not\subset$
{7, 9, 10}	{6, 7, 8, 9, 10}	X .... Y
{a, b, c}	{a, b, d, e}	X .... Y
{1, 2, 3}	The set of the prime numbers	X .... Y
The letters of (Ragb)	the letters of (Gabr)	X .... Y
{January, March}	The months of the gregorian year	X .... Y
{London}	The set of the capitals of all the world's countries	X .... Y

Look at the opposite Venn diagram, then complete the following using one of the symbols $\subset$, $\not\subset$, $\in$ or $\notin$

Ⓐ y .... X Ⓑ 2 .... X Ⓒ {5} .... Y

Ⓓ 6 .... Y Ⓔ 4 .... X Ⓕ {6, 8} X



Stat(Find the subsets for each of the following sets:

Ⓐ {8} **the subsets** ....

Ⓑ {Ø} **the subsets** ....

Ⓒ {3, 5, 9} **the subsets** ....

....

....

Ⓓ **The set of the letters forming the word (bibi).**

the subsets ....

....

Ⓔ {5, 6}. **the subsets** ....

....

By using the opposite Venn diagram,

complete



X = ...

Y = ...

Z = ...

complete by using the suitable sign $\in$, $\notin$, $\subset$ or $\not\subset$:

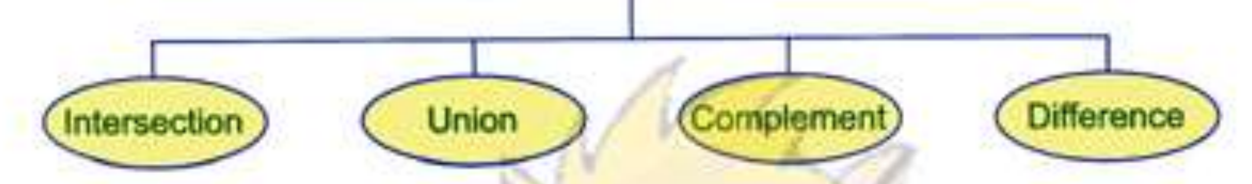
3 .... X X .... Y {1, 4} .... Y

{1, 6} .... X Z .... Y 5 .... Z



Lesson 5&6 Operation on sets (Intersection & Union)

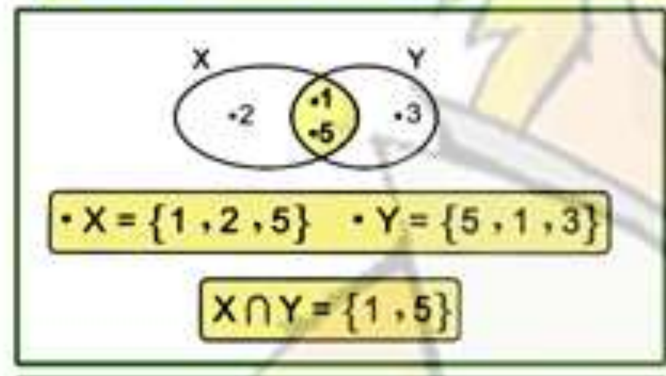
Operations on sets

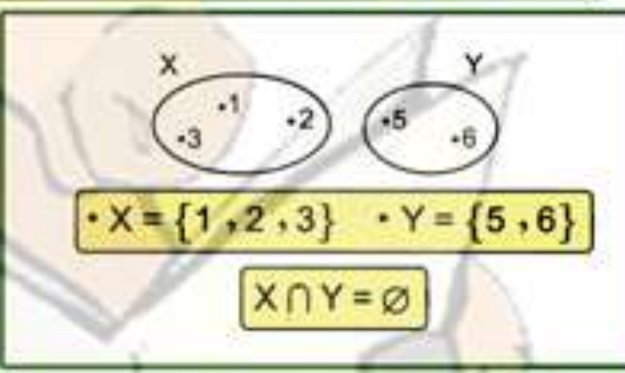


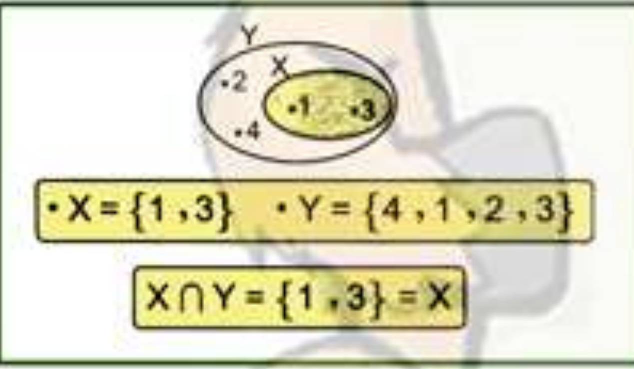
First The intersection "∩"

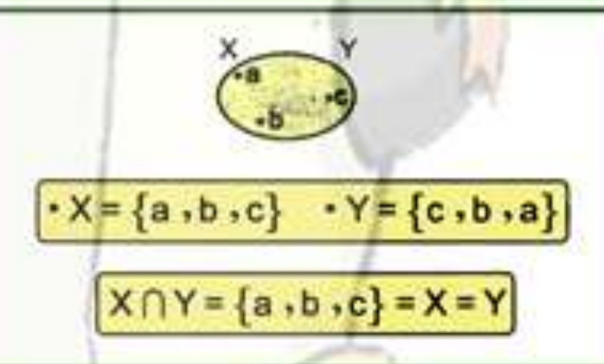
The intersection of the two sets X and Y , is that set which contains all the elements belonging to X and Y

i.e. $X \cap Y = \{a : a \in X \text{ and } a \in Y\}$









Properties of intersection

1. Intersection of sets is commutative : that is , $A \cap B = B \cap A$
2. Intersection of sets is associative : that is , $(A \cap B) \cap C = A \cap (B \cap C)$

If U is the universal set and A , B are two non-empty sets , then :

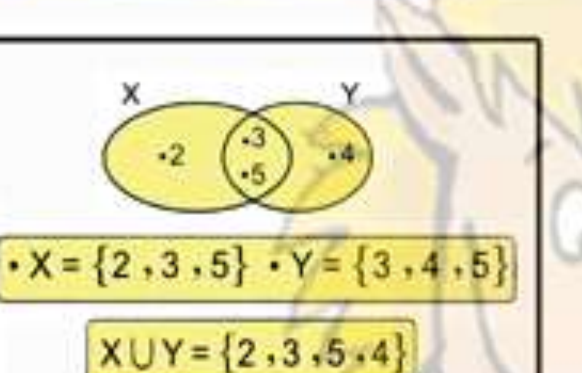
1. $U \cap A = A$
2. $\varnothing \cap A = A \cap \varnothing = \varnothing$
3. If $A = B$, therefore $A \cap B = A = B$
4. If $A \subset B$, therefore $A \cap B = A$

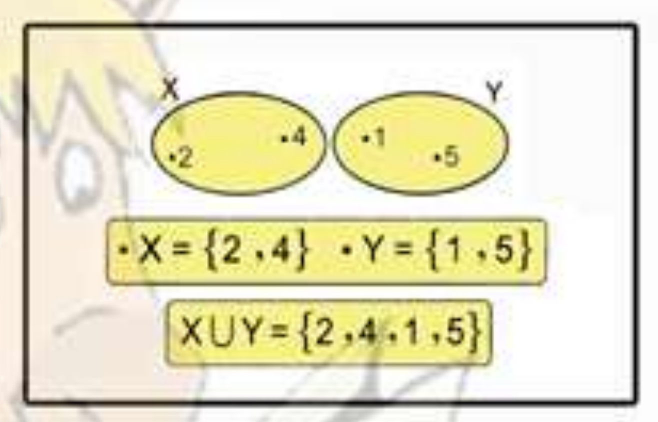
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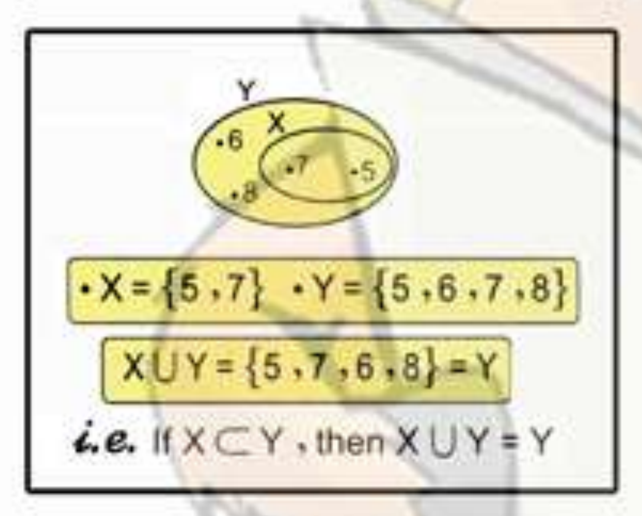
Second The union of two sets "U"

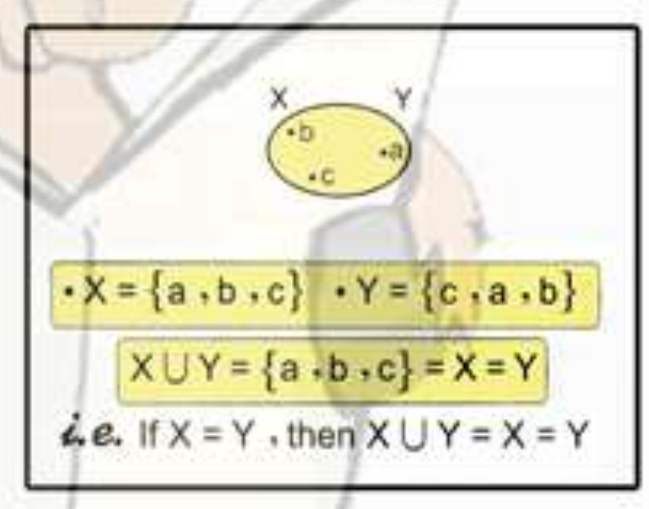
The union of the two sets X and Y is that set which contains all the elements belonging to X or Y

i.e. $X \cup Y = \{a : a \in X \text{ or } a \in Y\}$









Properties of union

1. Union of sets is commutative : that is, $A \cup B = B \cup A$
2. Union of sets is associative : that is, $(A \cup B) \cup C = A \cup (B \cup C)$

If U is the universal set and A , B are two non-empty sets , then :

1. $U \cup A = U$
2. $\varnothing \cup A = A$
3. if $A = B$, therefore $A \cup B = A = B$
4. If $A \subset B$, therefore $A \cup B = B$

The venn diagram below shows sets X, Y, and Z **List the elements of:**

(a) X ∩ Y = { .... }

(b) X ∩ Z = ...

(c) Y ∩ Z = { .... }

(d) X ∩ Y ∩ Z = ...

(e) X ∪ Y = { .... }

(f) X ∪ Z = { .... }

(g) Y ∪ Z = { .... }

(h) X ∪ Y ∪ Z = { .... }

X Y Z
2 12 4 5 9 13 17 1 8

The venn diagram opposite shows sets

List the elements of:

A = { .... }

B = { .... }

C = { .... }

A B C
a d f c e b h g

(a) A ∩ B = { .... }

(c) C ∩ A = { .... }

(b) B ∩ C = { .... }

(d) A ∩ B ∩ C = { .... }

(e) A ∪ B = { .... }

(f) B ∪ C = { .... }

(g) C ∪ A = { .... }

(h) A ∪ B ∪ C = { .... }

Complete:

(a) {5, 6} ∩ {4, 5} = ...

(e) {1, 2, 9} ∩ {1, 2, 4, 9} = ...

(b) {1, 7, 14} ∩ {2, 14,1} = ...

(f) {3, 2, 5} ∩ {4, 23, 55} = ...

(c) {2} ∪ {4} = ...

(g) {1, 5} ∪ {1, 3} = ...

(d) {1, 2, 12} ∪ {2, 3, 12} = ...

(h) {1, 4, 6} ∪ Ø = ...

Place the suitable symbol ∈, ∉, ⊂ or ⊄
to make each of the following sentences true:

Ⓐ If X = {1, 2, 3} ∩ {2, 4, 6} then 3 X

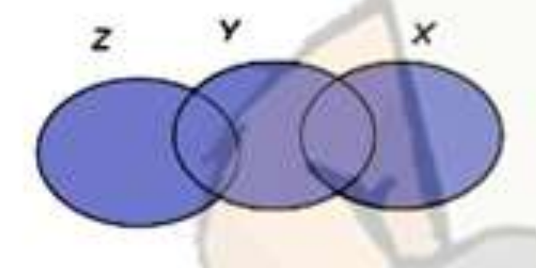
Ⓑ If Y = {2, 3, 5} ∩ {1, 3, 5} then {1, 2, 3, 5} .... Y

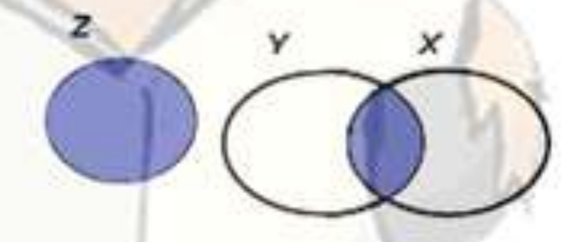
Ⓒ If Z = {3, 4, 5} ∩ {2, 3, 4} then 4 .... Z

Ⓓ If R = {2, 5, 6} ∩ {3, 5} then R.......... {2, 5}

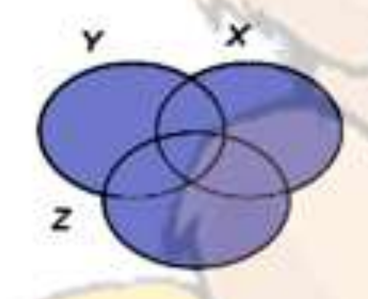
Ⓔ If M = {5, 2, 3} ∩ {1, 5} then M .... {2}

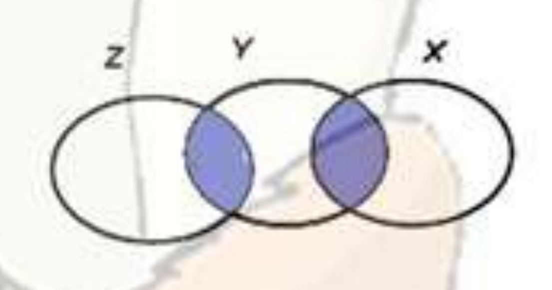
In each of the following Venn diagrams, write what the colored section represents:



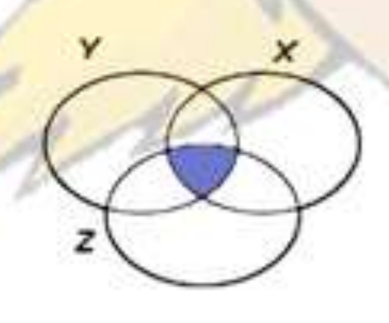


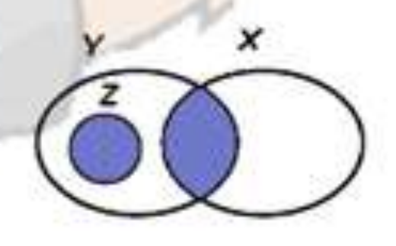
....





....





....

Operation on sets

Universal set - Complement - Difference

The Universal set

- The universal set containing all the elements that can be used in a question is called the universal set. It is written as U.

The univeral set (U) is the mother set which includes all the given subsets.

The given sets in each of the following cases represent subsets, write down a suitable universal set for each case:

1. X = {Cairo, Helwan, 6th of October city}, Y = {Sharqya, Alexandria}

   U= ....

2. X = The set of Math teachers at your school.

   Y = the set of science teachers at your school.

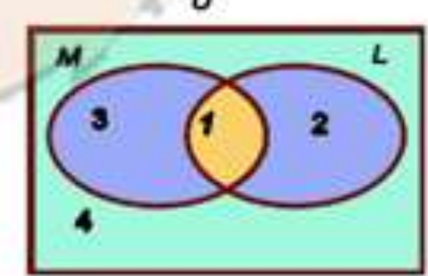
   U= ....

3. X = { 2, 5, 8} Y = { 2, 3, 7, 8 }

   U= ....

(represent U by Venn diagram)

4. The opposite Venn diagram represents the two sets L, M and the universal set U. If we give each different section within the Venn diagram one of the following numbers: 1, 2, 3, 4 . Can you represent the following sections using the two sets L, M and the symbols ∩ and ∪.



(A) Section 1 $M \cap L$

(B) Sections 2, 1 and 3 $M \cup L$

(C) Sections 1 and 3 M

(D) Sections 2 and 1 L

Third — The complement of a set

The complement of set A is the set of all elements in the universal set U that are not in A and it is denoted by $\acute{A}$

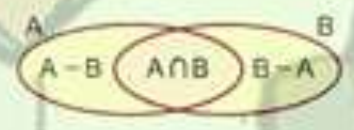


This coloured area outside A represents $\acute{A}$

The complement of the complement of A is A itself.	*i.e.* $(\acute{A})' = A$
The set A and its complement $\acute{A}$ are disjoint.	*i.e.* $A \cap \acute{A} = \varnothing$
The union of a set and its complement is the universal set.	*i.e.* $A \cup \acute{A} = U$
The complement of the universal set "U" is the empty set "$\varnothing$"	*i.e.* $\acute{U} = \varnothing$
The complement of the empty set "$\varnothing$" is the universal set "U"	*i.e.* $\acute{\varnothing} = U$

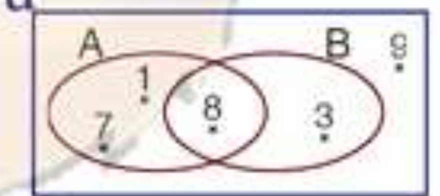
Fourth — The difference of two sets

- The difference of two sets A and B is the set of elements that are in A but not in B. It is written as "A – B"
- The difference of two sets B and A is the set of elements that are in B but not in A. It is written as "B – A"



- If X and Y are two sets such that $X \cap Y = \varnothing$, then $X - Y = X$ and $Y - X = Y$
- If $X = Y$, then $X - Y = \varnothing$ and $Y - X = \varnothing$
- If $X \subset Y$, then $X - Y = \varnothing$
- $X - U = \varnothing$, $U - X = \acute{X}$ "Where U is the universal set"
- $\varnothing - X = \varnothing$, $X - \varnothing = X$, $X - X = \varnothing$

In the venn diagram, U is the universal set,



then $A' = \{\ldots, \ldots\}$, $B' = \{\ldots, \ldots, \ldots\}$,

$(A \cup B)' = \{\ldots\}$, $(A \cap B)' = \{\ldots, \ldots, \ldots, \ldots\}$

$A - B = \{\ldots, \ldots\}$, $B - A = \{\ldots\}$, $B - U = \ldots\ldots$, $A - U = \ldots\ldots$

$U - A = \ldots\ldots$ $U - B = \ldots\ldots$

$U - (A \cup B) = \ldots\ldots$ $U - (A \cap B) = \ldots\ldots$

$X = \{6, 7\}$, $Y = \{6, 7, 9\}$, $Z = \{7, 8, 9, 10\}$ **List each of the following sets:**

(a) $X \cap Y =$ .... $X \cap Z =$ ....

$X \cap Y \cap Z =$ ....

(b) $X \cup Y =$ .... $Y \cup Z =$ ....

$X \cup Y \cup Z =$ ....

(c) $Y - X =$ .... $Z - Y =$ ....

$X - Y =$ ....

The figure opposite is a venn diagram for the sets X, Y and Z.

List each of these sets:

$X =$ ....



$Y =$ ....

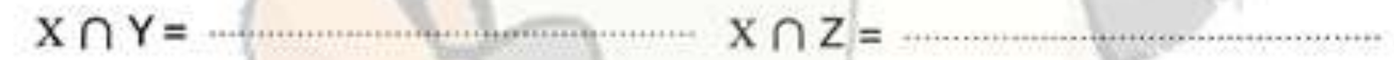
$Z =$ ....

$U =$ ....

$X' =$ ....

$Y' =$ ....

$Z' =$ ....



$X \cap Y =$ .... $X \cap Z =$ ....

$X \cap Y \cap Z =$ ....

$X \cup Y =$ .... $Y \cup Z =$ ....

$X \cup Y \cup Z =$ ....

$Y - X =$ .... $Z - Y =$ ....

$X - Y =$ ....

Write each of the following sets using the symbols: $\cap$, $\cup$ and the letters X, Y, and Z.

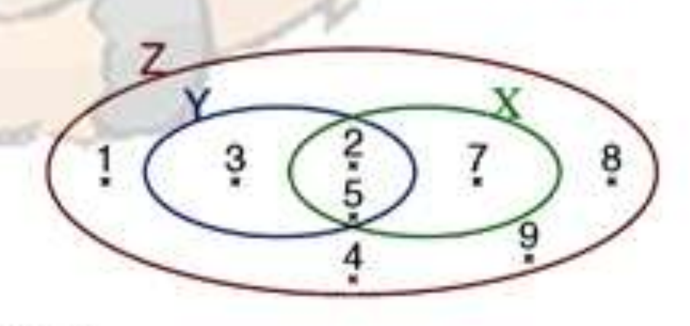
(a) $\{2, 3, 5\} =$ ....

(b) $\{2, 5, 7\} =$ ....

(c) $\{2, 5\} =$ ....

(d) $\{2, 3, 5, 7\} =$ ....

(e) $\{1, 2, 3, 4, 5, 7, 8, 9\} =$ ....



1 Place the suitable symbol $\in$, $\notin$, $\subset$ or $\not\subset$ in the blanks:

- (A) 8 .... {5, 7}
- (B) {3} .... {1, 3, 2}
- (C) 2 .... {22, 44}
- (D) {1, 2} .... The set of prime numbers
- (E) $\varnothing$ .... {0}
- (F) $(X \cap Y)$ X

2 Complete each of the following sentences to have a true sentence:

- (A) If X = {2, 3}, Y = {3, 5}, then $X \cap Y$ = ...
- (B) If {1, X} = {2, Y}, then X = ..., Y = ...
- (C) If $X \subset Y$, then $X \cup Y$ = ..., $X \cap Y$ = ...
- (D) {1, 2, 4} - {2, 4, 6} = ...
- (E) If $4 \in$ {2, X, 7}, then X = ...

3 Choose the true sentence from the parentheses:

- (A) {1, 7} .... {0, 1, 2, 3, 4, ...} ($\in$ or $\notin$ or $\subset$ or $\not\subset$)
- (B) X - X = ... $\varnothing$ or (zero or {0} or {1})
- (C) If {2, 5, 7} = {5, A, 2} then A = ... (2 or 5 or 7 or 0)
- (D) {5} - {1, 2, 5} = ... ({5} or {1, 2} or $\varnothing$ or {1, 2, 5})
- (E) The number of subsets for the set {5} is .... (0 or 1 or 2 or 3)

4 If U ={1, 2, 3, 4, 5, 6 }, X = {2, 3, 5} and Y= { 3, 4, 5}. Represent the sets by Venn diagram, then write each of the following by the listing method.

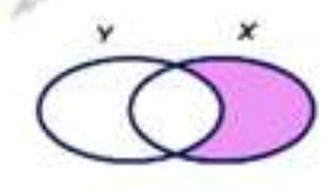
$X \cup Y$ = ...

$X \cap Y$ = ...

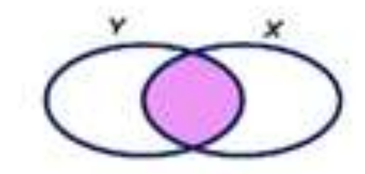
$X - Y$ = ...

X' = ...

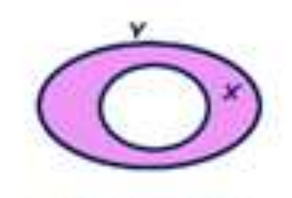
5 Describe the colored section in each of the following shapes:



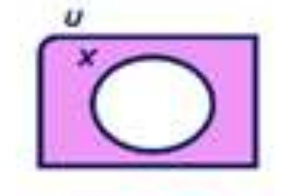
....



....



....



....



6 Look at the opposite Venn diagram and find the following sets using the listing method:

(A) $X \cup Y$ = ... (B) $X \cap Y$ = ...

(C) $X - Y$ = ... (D) Y' = ...

(E) $(X \cup Y)'$ = ...

7 Write down all the subsets for the set $X = \{a, b, c\}$

....

8 Look at the opposite Venn diagrams, then find the following sets using the listing method:

(A) $X \cap Z$ = ...

(B) $X - Y$ = ...

(C) $Y - Z$ = ...

(D) $X \cup Z$ = ...

(E) $Z - X$ = ... (F) X' = ...

9 If $X = \{3, 4, 5\}$, $Y = \{2, 3, 4\}$
place the suitable symbol $\in$ or $\notin$ or $\subset$ or $\not\subset$ in the blanks.

(A) 2 ...... X (B) {3, 5} ...... $X \cap Y$ (C) {3, 2} ...... $X \cup Y$

(D) 5 ...... $X - Y$ (E) $\varnothing$ ...... Y (F) {2, 3, 4} X

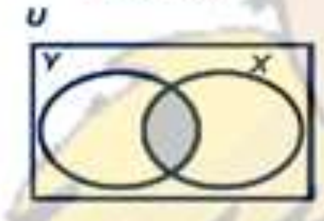
10 Find the value of x to make each of the following sentences true.

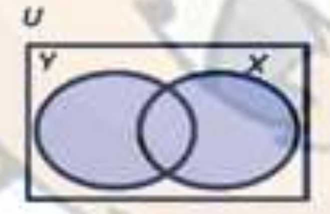
(A) $3 \in \{5, 7, x + 1\}$ ....

(B) $X \in \{2, 5\} \cap \{3, 5\}$ ....

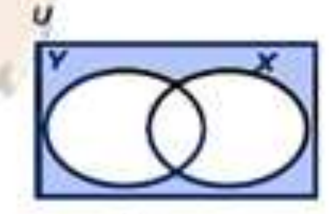
(C) $\{2, X\} \cap \{3, 7\} = \{3\}$ ....

11 Write down what each colored section represents in the following Venn diagrams.









....

12 Find all the subsets for the set $X = \{a, b, c, d\}$ where each subset has 2 elements.
Find the number of those sets.

....

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Unit 3

GEOMETRY

Lesson One The Circle .

Lesson Two: Drawing a triangle given the lengths of its three sides .

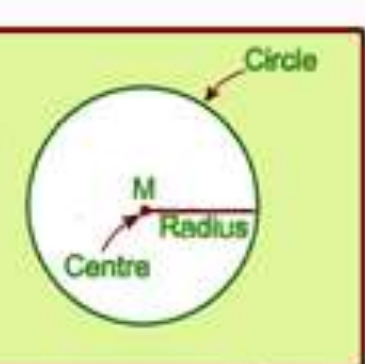
Lesson Three: Drawing line segements from the vertices of a triangle perpendicular to its opposite sides .

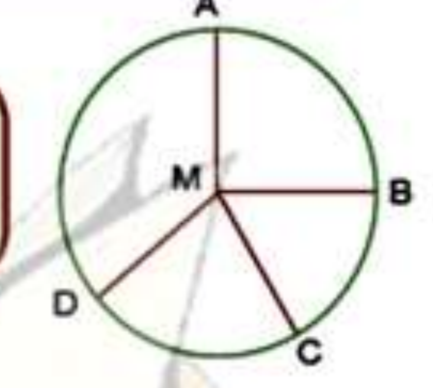
Lesson 1 The Circle

Definition of a circle

The circle is a closed curve , all the points on it having the same distance from a fixed point.

* The fixed point is called the "centre" of the circle.
* The constant distance is called the "radius length" of the circle.

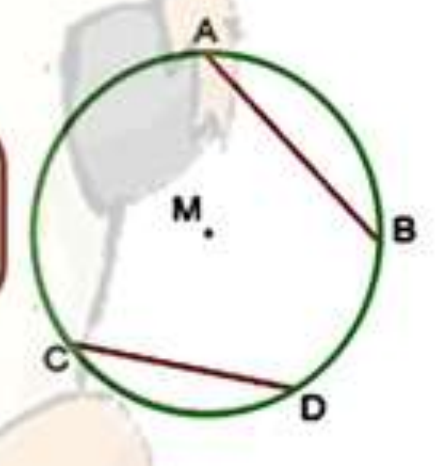




The radius:
The radius of a circle is a line segment whose endpoints are the center of the circle, and any point ∈ the circle.

Ex.: $\overline{MA}$, $\overline{MB}$, $\overline{MC}$, $\overline{MD}$

So, MA = MB = MC = MD = r



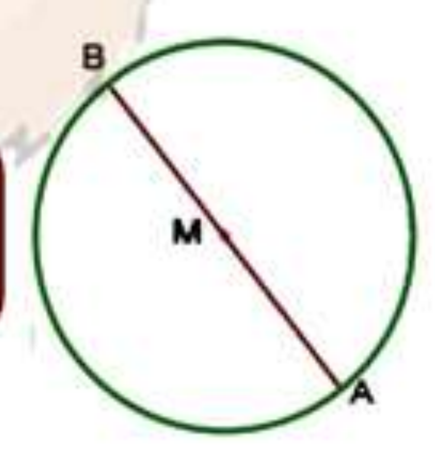
The chord of a circle:
The chord of a circle is a line segment that connects between any two points on the circle.

Ex.: Draw $\overline{AB}$, $\overline{CD}$, Draw each: $\overline{AC}$, $\overline{AD}$

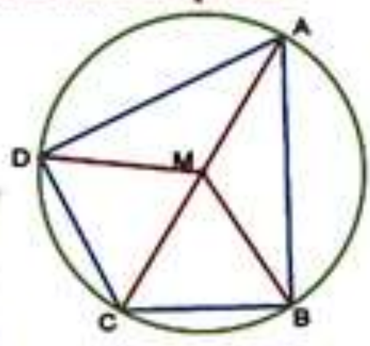
Complete $\overline{AC}$ is called ....,

$\overline{AD}$ is called ....

The diameter of a circle: The diameter of a circle is a chord that crosses the center of the circle.
diameter = 2 x Radius = 2r
The diameter is the longest chord in a circle.



1. **In the opposite figure, there is a circle whose center is M. Complete:**



The radii of the circle are ………, ………

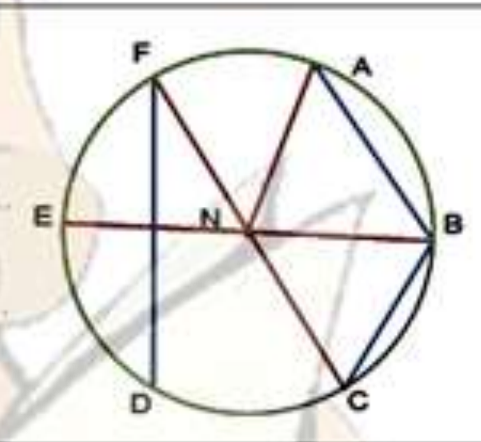
, ………, ………

The diameter of the circle is ……

The chords of the circle are ………, ………

, ………, ………

2. **In the opposite figure, there is a circle whose center is N. Complete:**



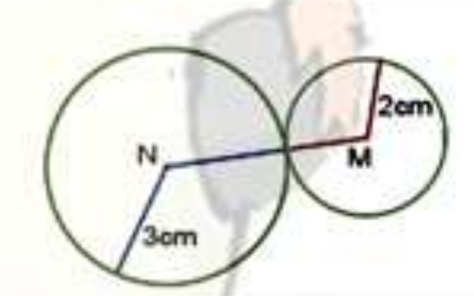
The radii of the circle are ………

The diameters of the circle are ………

The chords of the circle are ………

3. **In the opposite figure; M, N are two circles.**

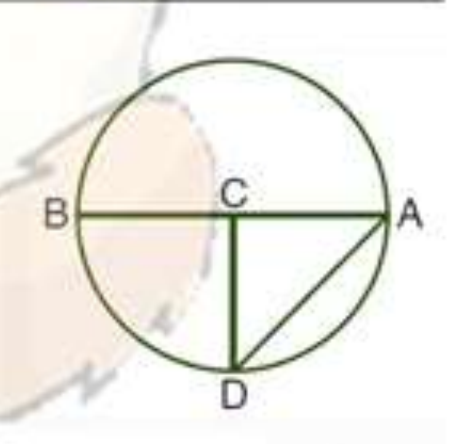
Find the length of $\overline{MN}$



………

………

4. **In the figure opposite, complete:**



(a) $\overline{AB}$ is a ……… in the circle.

(b) $\overline{BC}$ is a ……… in the circle.

(c) The point …… is a the centre of the circle.

(d) $\overline{AD}$ is a ……… in the circle.

(e) The line segments ………, ………, and ……… are radii in the circle.

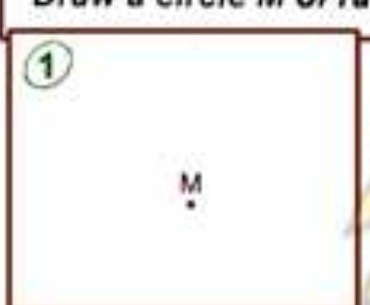
Complete the table.

Radius	3 cm	5 cm	.....	.....	18 cm	.....	1.8 cm	.....
Diameter	.....	.....	16 cm	22 cm	.....	6.8 cm	.....	9.4 cm

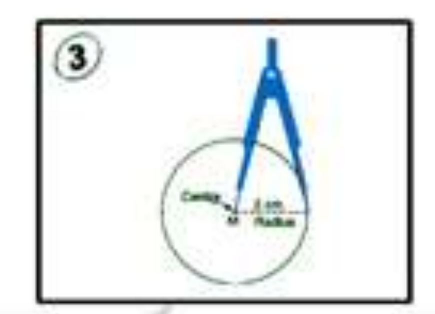
How to draw a circle

* The compasses is used to draw a circle.
* To draw a circle we have to know the length of its radius.

Draw a circle M of radius length 2 cm.







Use a compass and centimeter ruler to draw a circle with:

(a) radius 3 cm
(b) radius 3.5 cm
(c) diameter 4 cm
(d) diameter 8 cm

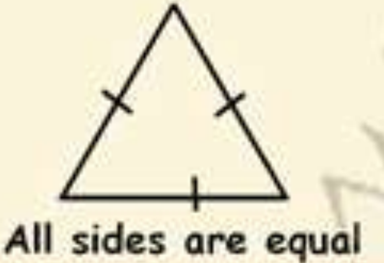
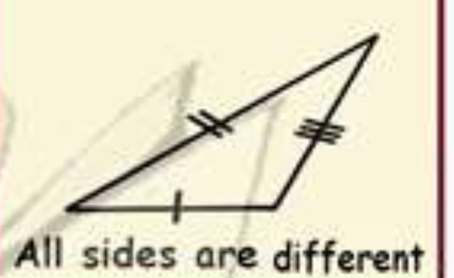
Draw a circle with radius length 4.5 cm, draw the chord $\overline{AB}$ of length 6 cm. and draw an angle BAC of measure 90° to meet the circle at C Measure the length of $\overline{AC}$



Lesson 3 Drawing a triangle

* The triangle is a polygon that has three sides , three angles and three vertices.
* Any triangle has at least two acute angles.
* The sum of measures of the interior angles of a triangle is 180°
* Any triangle can be classified according to :

1 The lengths of its sides

Equilateral triangle	Isosceles triangle	Scalene triangle
		
All sides are equal	Two sides only are equal	All sides are different

2 The measures of its angles :

Right angled triangle	obtuse angled triangle	acute angled triangle
		
1 right angle 2 acute angles	1 obtuse angle 2 acute angles	3 acute angles

Example

Draw the triangle ABC in which
CA = 4 cm. , AB = 6 cm. and BC = 5 cm.

It is preferable to choose the longest side and make it the base of the triangle.

Step 1
Use your ruler to draw $\overline{AB}$ with Length 6 cm

Step 2
Set your compass to 5 cm and with B as a centre, draw an arc.

Step 3
Reset the compass to 4 cm and with A as a centre, draw another arc to intersect the first arc at C.

Step 4
Draw $\overline{AC}$ and $\overline{BC}$, then ABC is the required triangle.

Draw the triangle ABC in which AB = 4 cm, BC = 3 cm and AC = 5 cm.

What type of this triangle, according to its angles?



Draw the triangle ABC in which AB = 10 cm, BC = CA = 7 cm

What type of Δ ABC according to its sides?

Draw the triangle XYZ in which

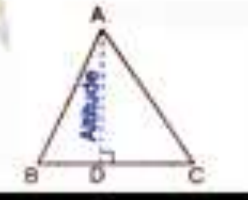
XY = YZ = ZX = 6 cm.

Drawing line segment from the vertices of a triangle perpendicular to its opposite sides

The altitude of a triangle is a line segment drawn from a vertex of the triangle perpendicular to its corresponding base , or to corresponding base extended.

For example : In the following figures :

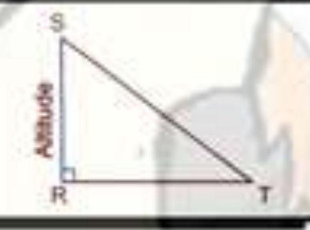
$\overline{AD} \perp \overline{BC}$ So, $\overline{AD}$ is an altitude of Δ ABC corresponding to the base $\overline{BC}$



$\overline{XM} \perp \overleftrightarrow{ZY}$ So, $\overline{XM}$ is an altitude of Δ XYZ corresponding to the base $\overline{YZ}$



$\overline{SR} \perp \overline{RT}$ So, $\overline{SR}$ is an altitude of Δ SRT corresponding to the base $\overline{RT}$



Notice that :

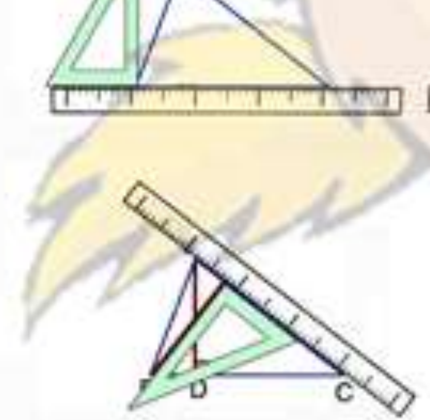
The length of the altitude of the triangle is called the height of the triangle.

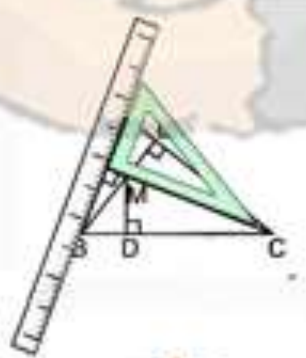
Drawing the altitudes of the triangle

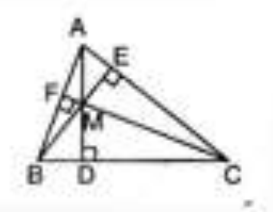
First The altitudes of an acute-angled triangle

A

B D C

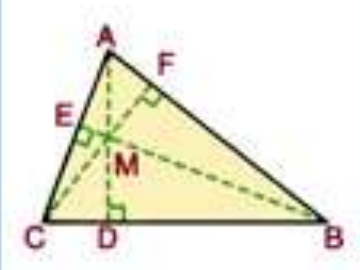






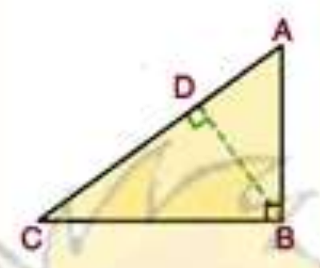


The altitudes of the acute-angled triangle



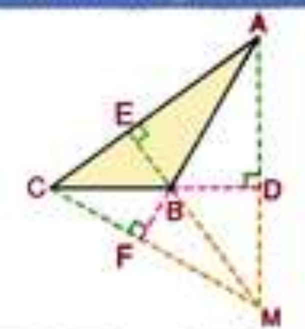
$\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ are the **altitudes** of Δ ABC
They **intersect** at one point (M) **inside the** triangle.

The altitudes of the right-angled triangle



$\overline{AB}$, $\overline{BC}$ and $\overline{BD}$ are the altitudes of Δ ABC
They intersect at one point B which is the **vertex of the right angle**

The altitudes of the obtuse-angled triangle

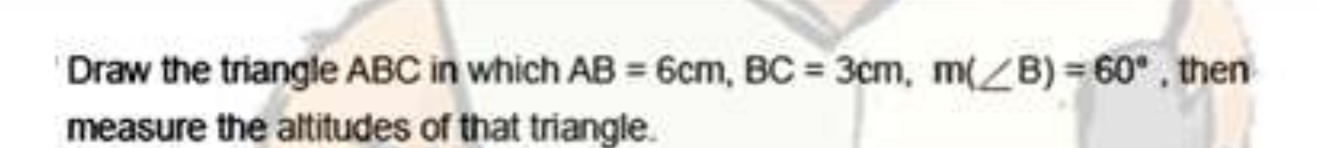


$\overline{AD}$, $\overline{BE}$ and $\overline{CF}$ are the altitudes of Δ ABC
Note that : $\overrightarrow{AD}$ and $\overrightarrow{CF}$ lie outside Δ ABC and the three altitudes intersect at one point (M) **outside** the triangle.

use a ruler and a set square to draw the altitudes, then measure the length of each altitude.

Draw the equilateral triangle ABC whose side is equal to 6cm. Then from its vertices, draw the segments $\overline{AD}$, $\overline{BE}$, $\overline{CF}$ perpendicular to the opposite sides: $\overline{BC}$, $\overline{CA}$, $\overline{AB}$ respectively. Then, measure the lengths of $\overline{AD}$, $\overline{BE}$, $\overline{CF}$. What do you observe?

Draw the isosceles triangle ABC whose right angle is B and in which AB = 5cm, then draw the line segment $\overline{DB}$ from point B perpendicular to $\overline{AC}$ and find the length of that line segment.



Draw the triangle ABC in which AB = 6cm, BC = 3cm, $m(\angle B) = 60°$, then measure the altitudes of that triangle.

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Draw the triangle ABC in which AB = 5cm, BC = 6cm, m (∠B) = 120° . Then, draw $\overline{AD}$ perpendicular to $\overleftrightarrow{BC}$, and measure the length of $\overline{AD}$. Draw also $\overline{BE}$ perpendicular to $\overleftrightarrow{AC}$ and measure the length of $\overline{BE}$.

Are $\overleftrightarrow{AD}$ and $\overleftrightarrow{BE}$ intersected at one point?

① Put (✓) for the true sentence and (✗) for the false one:

Ⓐ The length of the diameter of a circle > the length of any chord which doesn't pass throught its center. ( )

Ⓑ The right triangle has only one altitude. ( )

Ⓒ The line segments drawn from the vertices of the acute triangle perpendicular to the opposite sides intersect at one point inside the triangle. ( )

Ⓓ Only one diameter can be drawn from any point on the circle. ( )

Ⓔ The diameter of the circle divides it into two equal halves. ( )

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② Draw a circle whose center is N and diameter is 6cm. Then draw the diameter $\overline{AB}$ and the chord $\overline{AC}$ in the circle. Draw $\overline{BC}$. Use the portractor to measure $\angle ACB$ then draw $\overrightarrow{CD} \perp \overline{AB}$ that intersects it at D and the circle at E, then choose the correct answer:

Ⓐ The triangle ABC is .... (right triangle - acute traingle - obtuse traingle)

Ⓑ $\overline{CE}$ is .... in the circle (chord - diameter - radius).

Ⓒ The intersection point of the perpendicular line segments drawn from the vertices of the triangle ABC to the opposite sides is (C - D - E)

(3) Draw a circle whose center is M and radius 4cm then draw two radii $\overline{MX}$, $\overline{MY}$ and the included angle between them

measures 60° then draw $\overline{XY}$

and find the length of $\overline{XY}$.

(4) Draw the triangle ABC in which AB = 7cm ,

BC = CA = 6cm. Then, draw the line segment

from point C that is perpendicular to $\overline{AB}$

and find its length.

(5) Draw the triangle XYZ in which

XY = 3cm, YZ = 5cm, ZX = 7cm.

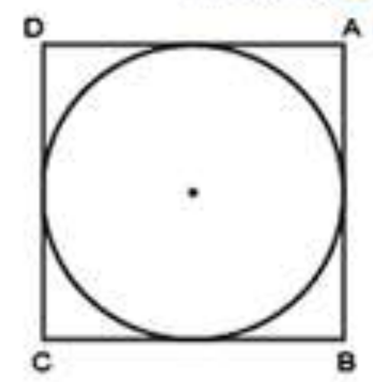
Determine the type of the triangle

according to the measures of its angles,

then draw the perpendicular segment

from X to $\overline{YZ}$ and measure its length.

⑥ In the opposite figure, find the perimeter of the square ABCD given the length of the circle's radius = 3cm

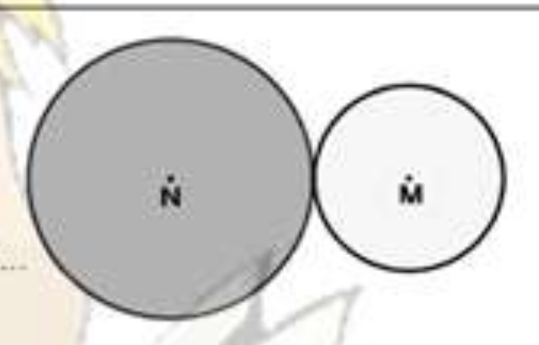


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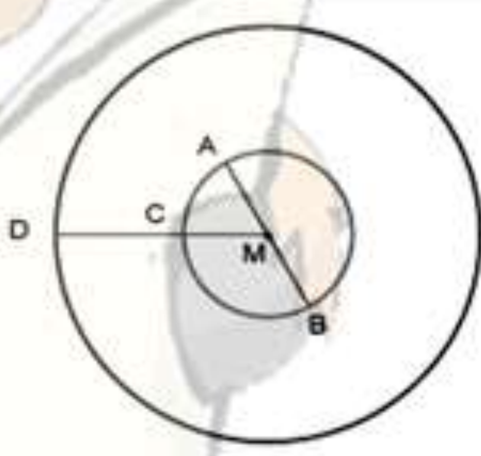
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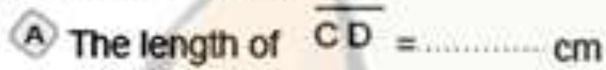
⑦ In the opposite figure, M, N are two circles where their diameters are 4cm, 6cm. Find the length of $\overline{MN}$.



....

⑧ **In the opposite figure, there are two circles with the same center M. If their radii were 2cm, 5cm. Complete:**





Ⓐ The length of $\overline{CD}$ = ... cm

Ⓑ The length of $\overline{AB}$ = ... cm

Draw the ray $\overrightarrow{DC}$ from D which intersects the small circle at E and intersects the large circle at F, then find the length of $\overline{DF}$.

⑨ Draw the triangle ABC in which AB = 6cm, BC = 8cm and AC = 10cm. Draw the circle M in which $\overline{AC}$ is the diameter and find the length of $\overline{MB}$.

Unit 4

Probability

Lesson One :	Experimental Probability
Lesson Two :	Theoretical Probability

Lesson 1&2 Experimental Probability Theoretical Probability

The random experiment :

It is an experiment in which we can determine all its possible outcomes before carrying it, but we can't predict in certainty which of these outcomes will occur when the experiment is carried out.

Sample space (outcomes)

The set of all possible outcomes for a random experiment.

The event

It is a subset of the set of sample space, the number of its elements represents number of times of its occurrence.

Any outcomes you can get inside a random experiment are called events.

$$P(A) = \frac{\text{number of elements of the event (A)}}{\text{number of elements of the sample space}}$$

From the previous , we find that :

- The probability of the impossible event = 0
- The probability of the certain (sure) event = 1
- The probability of any other events is between 0 and 1

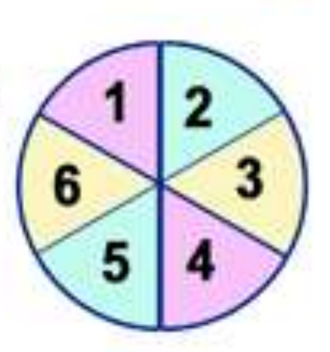
★ Bassem tossed the coin 50 times and recorded the results in the opposite frequency table.

★ From the table , we find that Bassem got 24 heads up and 26 tails up , which is close to his prediction.

Outcomes	Tally	Frequency
Heads	卌 卌 卌 卌 ////	24
Tails	卌 卌 卌 卌 卌 /	26

- The probability of appearance of a head = $\frac{\text{number of heads}}{\text{number of tosses}} = \frac{24}{50}$
- The probability of appearance of a tail = $\frac{\text{number of tails}}{\text{number of tosses}} = \frac{26}{50}$

The opposite figure represents a spinner game divided into 6 equal circular sectors. If the pointer is spinned once, find :



[a] The probability that the pointer stops at an odd number.

[b] The probability that the pointer stops at a number greater than 2

[c] The probability that the pointer stops at a number less than 1

[d] The probability that the pointer stops at a number less than 7

There are 6 equally likely outcomes : ....

[a] The odd numbers are : .... , ... and ....
the probability that the pointer stops at an odd number is —— = —— = ...

[b] The numbers greater than 2 are .... , ... , ... and ....
the probability that the pointer stops at a number greater than 2 is —— = —— = ...

[c] The numbers less than 1 are : ....
The probability that the pointer stops at a number less than 1 is —— = —— = ...

[d] The numbers less than 7 are : ....
The probability that the pointer stops at a number less than 7 is —— = —— = ...

What if these cards are in a box and you choose one of them?

1 3 5 7 9 11

(a) What are the possible outcomes?

(b) What is the probability of choosing the card with the number 9?

(c) What is the probability of choosing a red card?

(d) What is the probability of choosing a card with a number less than 6?

[a] ....

[b] ....
....

[c] ....
....

[d] ....
....

A bag contains 1 yellow, 3 green and 6 red balls. One ball is taken out at random :

Calculate **[a]** the probability that the ball is yellow. ....

[b] the probability that the ball is green. ....

[c] the probability that the ball is red. ....

[d] the probability that the ball is blue. ....

A die is tossed once, what is the probability of the appearance of each of the following on the top face of the die?

(a) an odd number greater than 2?

(b) A number between 0 and 9?

(c) A prime number?

(d) Zero ?

....

....

....

....

....

Rolling a number cube numbered from (1 to 6) 250 times. How many times are predicted to get an even number?

....

....

If you roll a die 30 times , predict how many times will a number greater than 4 appear on the top face.

....

....

....